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ABSTRACT

Papers on the application of statistics to library research and library administration which were presented at the 1982 International Federation of Library Associations (IFLA) conference include: (1) "Price Indexes for Library Materials: Steps toward International Standardization" by Frederick C. Lynden (United States); (2) "Australian Census of Library Services: A Pragmatic Approach" by Nick Mayman and G. G. Allen (Australia); (3) "Statistical Model for Data Analysis and Networks" by Daniel O. O'Connor (United States), which presents an evaluation model based on the probability of satisfying a request for services, and the average waiting time and average cost of satisfying a request; (4) "Viewpoint of a Network Administrator and a University Library Administrator," a review by Glyn T. Evans (United States) of the availability of statistical reports from bibliographic utilities and the use of OCLC distribution tapes as a source of management data; (5) "Aspects of Library Statistics in Brazil" by Maria Beatriz Pontes de Carvalho; (6) "Standardization of Statistics: The Experience of the Quebec University Libraries" by Claude Bonnelly (Canada) and other members of a statistics task force; and (7) "Library Management Information Systems: Concept, Potential, and Plan of Action" by Neal K. Kaske (United States), which discusses library management information systems at local, state, regional, national, and international levels. (ESR)

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STATISTICS SECTION

MANAGEMENT AND TECHNOLOGY DIVISION

PAPERS

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Division: Management and Technology

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Price Indexes for Library Materials: Steps toward International Standarization

by

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ABSTRACTS:

Price Indexes for Library Materials: Steps toward International Standardization

by

Frederick C. Lynden

English Abstract: Price Indexes are a standard means of showing price changes over a period of time. The author describes the history and background of library materials price indexes in the United States and the development of the American National Standard Criteria for Price Indexes for Library Materials (1974). He discusses the recent revision of the 1974 American standard, and the possible use of the revision as a model for international library materials price indexes. He also comments on the international efforts to promote price indexes, and urges adoption of an international standard.

German Abstract: Preis Indices sind massgebebende Indikatoren von Preis Aenderungen ueber eine bestimmte Zeitspanne. Der Autor beschreibt die Geschichte und den Werdegang der Preis Indices und die Entwicklung der amerikanischen nationalen Normkritierien fuer Preis Indices von Bibliotheksmaterialien (1974). Er bespricht die juengsten Revisionen der amerikanischen Norm von 1974 und den moeglichen Gebrauch dieser Revision als Vorbild fuer internationale Preis Indices fuer Bibliotheksmaterialien. Er nimmt ausserdem Stellung zu den internationalen Versuchen Preis Indices zu foerdern und empfiehlt eindringlich die Annahme eines internationlen Norms.

French abstract: Les indices de prix sont un moyen standard de calculer les changements de prix pour une période de temps donnée. L'auteur donne l'historique des indices de prix pour livres et journaux destinés aux bibliothèques aux Etats-Unis, et développe les critères destinés à établir ces indices (1974). Il etudie la recente révision des standards pour 1974, et l'usage possible de cette révision comme modèle pour la création d'un indice de prix international pour ce matériel. Il commente aussi sur les efforts faits pour promulguer les indices de prix au niveau international et conseille vivement l'adoption de standards internationaux.

Nine years ago this month, Doralyn Hickey, University of North Carolina Library School, addressed the IFLA Committee on Statistics and Standards on the topic "Price Indexes for Library Materials: a 1973 Perspective." The goal of her talk was to urge the IFLA Committee on Statistics and Standards to "move toward the development of a viable international standard for price indexes for library materials."[1] The parallel's between 1973 and 1982 are striking. In 1973, just as today, many countries of the world were faced by an economic recession, and there were increasing pressures to reduce library budgets. Furthermore, American librarians were discovering a need for price indexes for non-English language materials. Ms. Hickey noted that many American research libraries were spending as much as thirty percent of their budgets on foreign materials, and she argued that responsible U.S. administrators needed to be aware of price changes, not only of American library materials, but of foreign library materials as well. She indicated that the credibility of the library professional was at stake anywhere information about library materials price changes was inadequate or non-existent. Finally, there was another similarity between 1973 and 1982. There was no international standard for price indexes for library materials.

Obviously there are some critical differences between 1973 and 1982. The profession has, in fact, made gigantic strides in the past nine years. In 1973 there were no national standard criteria for price indexes for library materials. In 1974, the American

National Standards Institute (ANSI) published the American National Standard Criteria for Price Indexes for Library Materials."[2] Indeed, the ANSI Standard Criteria are already in the process of revision as required by the standards group. In the intervening nine years, there have also been vast improvements in the accuracy and variety of indexes produced. The Library Materials Price Index Committee of the American Library Association is now responsible for producing price indexes for hardcover books, paperbacks, periodicals, serial services, library produced microfilm, non-print media, and newspapers.[3] The Committee also cooperates with the Library Association of Great Britain and E.H. Blackwell's of England, a book and periodical dealer, to produce both a British book and a British pericdical price index. A German index is done by the Price Index Committee from statistics from Buch und Buchhandel in Zahlen. Latin American average book prices are published in an annual cost study done by a group of libraries belonging to the Seminar on Acquisition of Latin American Library Materials (SALALM). Another specialized index, produced in England, is the British academic book price index begun in 1974.[4]

Since 1973, world library cooperation has also improved substantially. IFLA has promoted cooperation with its programs on Universal Availability of Publications and Universal Bibliographic Control, and the library world has seen a succession of standards, among them ISBD, MARC, and AACR2. The computer is now commonplace in many libraries and has made these advances possible. Unfortunately, there are still no

international criteria for price indexes for library materials. However, there is some very good news. One month ago, the International Organization for Standardization (ISO) approved the formation of a Working Group to begin the development of an international price index standard. The Working Group will be headed by Morten Hein, Bibliotekskonsulent, Biblioteksstilsynet in Copenhagen, and he has been asked to call a "first constituent" meeting. It is important that IFLA be involved in this endeavor and stay informed about the work of this group. In particular, it is essential that the Section on Statistics influence the work of this group so that member libraries will support the implementation of the standard in the future.

Much of the credit for encouraging the development of an international standard must go to William H. Kurth, the creator of the first American price index. Kurth was an innovator:

> Kurth's first published reference to his pioneering work appeared as an article entitled "A Proposed Cost of Books Index and Cost of Periodical Index" in the October 1955 issue of College and Research Libraries. Pointing out that price information for library materials was not being offered in the consistent statistical pattern required for meaningful application in analysis, budgeting, and planning, he proposed the development of cost indexes for books and periodicals by subject categories along the lines which would produce figures specifically useful to libraries.[5]

Kurth was also the first librarian to present a plan to IFLA for the development of international price indexes. In 1972, he spoke to the Committee on Statistics and Standards on "Price Indexes for Library Materials: the Need on an International Basis."[6] Two years later he chaired the ANSI Z-39 Subcommittee which created the American National Standard. In November 1974,

he again spoke to the IFLA Committee on Statistics and Standards about "A Strategy for Developing Price Indexes for Library Materials."[7] In this paper he gave the background for understanding how price indexes work, why they are needed, and his recommendations. They were:

> 1) the ANSI Standard "be considered by other national groups as the basis for the establishment of their own indexes..."
>
> 2) That librarians...a) work with their national standards agency affiliated with the International Standards Organization...b) base the work or place it in close conjunction with the national library association; c) maintain continuing relationship with the publishers' association; d) maintain liaison with the national statistical bureau reponsible for the compilation and issuance of educational publishing statistics.[8]

At this IFLA meeting, the Committee on Statistics and Standards passed the following resolution:

> The Committee endorses the ANSI (American National Standards Institute) standard on Price Indexes entitled "Criteria for Price Indexes for Library Materials" for consideration by ISO/TC 46 (The International Organization for Standardization, Technical Committee 46).[9]

Unfortunately, William Kurth did not live to see his dream realized. He died in 1977 without seeing an international standard created.

His legacy to the library world was the 1974 ANSI Standard which had a number of features of value for international comparisons. First, the standard gave preference to definitions from the UNESCO 1964 Recommendation Concerning the International Standardization of Statistics Relating to Book Production and Periodicals. Second, for subject classification, the standard offered the option of translating the Dewey Classification into the Universal Decimal Classification (UDC) and its twenty-three

groups as set forth in the UNESCO recommendation. Third, the country of publication definition encouraged "national indexes" as it was Kurth's intent that "an agency in each country prepare the price index information solely for its own output of library materials as a natural extension of its regular book and periodical statistics reporting."[10] As he pointed out this arrangement would avoid useless duplication.

Despite Kurth's pleas and the resolutions of the IFLA Committee no international standard was under development in 1977. However, in 1977 several events called attention to the needs for an international standard. In the Spring of 1977 LIBER (Ligue des Bibliotheques Europeennes de Recherche) held a seminar at the University of Leiden where LIBER members heard a plan from their Working Group on Management "to create an index on academic book prices and production for each European country."[11] Mr. Lynden, Chair of the Library Materials Price Index Committee of the American Library Association, also attended and addressed the group on American prices and price indexes. After discussion it was agreed that price indexes from four countries (Great Britain, Germany, France, and the Netherlands) would be produced. The LIBER concerns were reinforced in the summer of 1977 by Alexander Allardyce who urged that IFLA's Division of Collections and Services work on international coordination of price information. He pointed out:

> One of the most important practical fact-finding tasks now being carried on systematically in some countries and piecemeal in others is on book prices. IFLA has hitherto merely touched on it. It is now of far more than academic importance. Not only have book prices escalated through inflation, but in

> some countries inflation has been compounded by devaluation...The librarian's presentation to administrative authorities has to depend more upon induction and persuasion than on general information. Modern fiscal management requires a higher ratio of fact to opinion, and so the need for external evidence is great.[12]

At the IFLA meeting in September 1977 in Brussels, Jane Pulis, of the Library Materials Price Index Committee, addressed the Section on Statistics on the need for an international standard. She reported on developments in the U.S. and overseas, including the appointment of an Ad-hoc working group of ISO. At the same IFLA meeting, the Section on the Exchange of Publications offered the following resolution:

> IFLA is requested to take note of the Section's interest in book price indexes for various kinds of acquisition, to review their availability and relevance for the output of major publishing countries, and to take steps to have more complete, reliable, and prompt statistics made available.[13]

In November 1977 the ISO Ad-hoc Working Group met with Dr. Karl Neubauer as IFLA representative, and members from Great Britain, Germany, ISO, and the U.S.A. in attendance. The group agreed upon five points:

> 1) A price index for budgeting of libraries for resource allocation is necessary.
>
> 2) A price index must be internationally compatible.
>
> 3) The ANSI Price Index Standard (ANSI Z-39.20) should be used as a starting base for the development of an international standard.
>
> 4) There should be established a Working Group of ISO to prepare an international standard of price indexes for library materials in close cooperation with IFLA.
>
> 5) Germany and IFLA will make proposals for some changes of the ANSI standard for international use.[14]

Unfortunately, despite these efforts, ISO-TC 46 did not establish

the working group as its attention was being devoted to other pressing issues.

In 1981, Robert Frase, Executive Director of the American National Standards Committee Z-39, raised the issue of a standard for price indexes for library materials at the Spring Plenary meeting of ISO/TC 46 in Nanking. A decision to circularize members about formation of a working group led to the appointment of the working group this year. Although five years have passed between the peak of interest in 1977, and the 1982 decision to establish an ISO Working Group, these years have not been quiet ones. There have been a number of changes and improvements in the price index situation. Some criticisms of existing price indexes were evident in 1977. Jane Pulis pointed to the concerns of librarians in the U.S. who contended that national indexes did not reflect local conditions.[15] Alexander Allardyce also mentioned some problems of existing indexes: timeliness, and not reflecting selection of materials in actual libraries, dealer discounts or mark-ups for foreign sales. He suggested that three steps are needed: international criteria with agreed upon subject categories; "national indexes based on trade prices for countries with substantial publishing output and indexes based on selections by different types and sizes of libraries."[16] All of these comments reflect legitimate concerns.

In the first case, that of price indexes reflecting local conditions, the Library Materials Price Index Committee (LMPIC) of the American Library Association has responded that national

and local indexes are not mutually exclusive, i.e., they are complementary. Libraries buy sub-sets of national production and it is not possible to show discounts or mark-ups in a national index due to the high variance from library to library. The LMPIC recommends libraries do local studies, and then compare them with national data. In the second case, that of slow publication, the Price Index Committee now publishes data in the bi-monthly RTSD Newsletter (Resources and Technical Services Division of the American Library Association) as soon as it is available. In the third case, that of exclusion of non-book materials, the LMPIC has now begun to index newspapers and media. The Price Index Committee is also working on the development of an academic price index for the United States.

The American National Standard Criteria for Price Indexes for Library Materials came up for revision in 1979, and the ANSI Revision Committee began meeting then to deal with some of the concerns noted above and other issues. If approved, the revised standard will have sections on a U.S. newspaper index and a media index. The revision will also respond to complaints about subject coverage; size of sample; and base period. The 1974 index criteria use Dewey classification for subject coverage (with an option to use UDC). Unfortunately, the Dewey breakdown used has not been very detailed. However, the revision permits three different classifications (LC, Dewey, or UDC), and is flexible on narrower subject breakdowns, with one caution: that compilers remember historical comparability. To deal with the size of the sample, the revised standard states that "when there

is a sizeable discrepancy between the total population and the index population, a sample drawn by currently existing statistical standards is preferred."[17] The revised standard also permits a base period of one year instead of requiring a three year base. It retains the international definitions as far as possible ,and uses ALA and AACR2 definitions for newer publication formats. The revision recommends using one currency, preferably the currency of the country of publication. Thus, the proposed revised standard continues the intent of William Kurth, that of providing a potential model for an international standard.

One feature of the proposed revision is designed to make it more valuable for the user. The revision requires that all future indexes include statements on: the materials included in the index, with appropriate definitions: the time span covered; the country or countries of publication included; the subject classification used; the methodology for compilation, including the source of data; and the estimated total population and the index population of materials covered. The Revision Committee has called these provisions: the "truth in indexing" statements. It is hoped that these statements will allow the user to evaluate the index. All indexes must still include: list price; number of volumes (or in the case of periodicals, number of titles); and average price by subject categories. The previous price index formula (the average price for the current year, divided by the average price for the base year, multiplied by 100) is still in use as well.

What is the need for this data? No one needs to be reminded of the economic conditions in the world today. Funds are scarce and library materials are costly. According to a recent study by the Association of Research Libraries, "From 1968/69 to 1978/79, ARL member libraries spent 91% more for library materials, yet added 22.5% fewer books to their collections."[18] Clearly American librarians are worried about the rising costs and shrinking budgets. An article from last year's European Studies Newsletter was entitled: "Will American libraries continue to have European books?"[19] The author was very pessimistic about building strong European collections and offered the following analysis:

> To summarize: libraries are in the grip of a profound and deep-seated inflationary period which ravages attempts to build European collections since the countries of Western Europe are not those most drastically affected. To cope with the situation libraries need 1) more information sharing about such topics as prices and sources...[20]

His first consideration was prices. Exchange librarians should also be concerned about inflationary trends since many exchanges are now based upon the monetary value of books. If an exchange librarian knows that prices of books in X country will be going up 15%, then this librarian knows that the value of books exchanged must also increase by 15%. This problem is undoubtedly behind the Section on Exchange of Publications' interest in book prices.

Past speakers on price indexes at IFLA have addressed the value of price indexes. It is helpful to remind you again of some reasons for promoting price indexes. First, they can be used to prepare and justify library materials budgets. Second,

they can be used for resource allocation by subject categories. Third, they can be used to analyze cost trends and aid in the planning for future budgets. Fourth, they can assist library administrators in interpreting the costs of their programs to those who control their funds. Fifth, they can be used to calculate the effects of materials cost increases on other parts of the library's budget. The quantitative information on publishing that goes hand in hand with price information can also be extremely helpful in indicating coverage of foreign output and related costs. In short, price indexes are an excellent management tool.

The obligations of the Section on Statistics with regard to encouraging an improvement in the price information situation have not been lessened by the appointment of a Working Group to establish international criteria for price indexes for library materials. On the contrary, they have perhaps been increased. IFLA's Section on Statistics can do the following:

1) Advise the ISO Working Group in its work on a standard for price indexes for library materials. This will insure the highest quality work is done.

2) Support the gathering of price data by IFLA libraries, including the compilation of a directory of sources of price data for library materials in member countries.

3) Give publicity to the international standard, once completed, and encourage its use.

4) Promote the timely publication of price indexes by member countries through announcements in the IFLA Journal about new or forthcoming price indexes for library materials.

5) Foster research by librarians of IFLA on price trends in member libraries by publishing studies in the IFLA Journal.

The establishment of the working group has not come too late. With the advent of improved computerized control of cost data, better bibliographic control of the publishing output of nations of the world, and continuing support from IFLA, the efforts to create international standard criteria for price indexes are bound to succeed.

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2. Nelson A. Piper, "Prices of U.S. and Foreign Published Materials," in the Bowker Annual of Library & Book Trade Information 27th Edition, 1982, New York and London, R.R. Bowker Company, 1982.

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5. Helen Welch Tuttle, "Price Indexes, Library Materials," in the Encyclopedia of Library and Information Science, Vol. 23, N.Y., Basel, Marcel Dekker, Inc., 1978, p. 254.

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7. William H. Kurth, "A Strategy for Developing Price Indexes for Library Materials," prepared for the IFLA Committee on Statistics and Standards, November 1974, 8 p.

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10. Kurth, "A Strategy for Developing Price Indexes for Library Materials,", p. 5.

11. "Academic Book Prices Discussion Paper LIBER-Meeting, 27 April 1977," LIBER Bulletin no. 9/10 (1978), p. 113.

12. Alexander Allardyce, "Some Opportunities for IFLA's Division of Collections and Services," IFLA Journal Vol. 3 (1977), p. 243.

13. "Resolutions from the Section on the Exchange of Publications," IFLA Annual, 1977, Munich, K. G. Saur, 1978, p.35.

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Australian Census of Library Services : a pragmatic approach

by Nick Mayman and G.G. Allen

Pre-Conf. Seminar on Statistics

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Australian Census of Library Services : A pragmatic approach

The purpose of this brief paper is to describe the problems associated with conducting a census of libraries in Australia, the steps being taken to overcome these problems and to elicit advice from anyone interested in the collection of library statistics.

Australian libraries, like many other aspects of Australian society, have both benefited and suffered from the federal system of government. The system of state library authorities, and independent academic institutions established under State Acts, has allowed flexibility to adapt to local conditions but has also meant a lack of co-ordination between library services. The increasing uncertainty of the environment in which libraries operate has, however, made obvious the need for closer co-operation between libraries. This uncertainty has meant libraries cannot afford, either financially or in terms of efficiency of service, to function without reference to the library and information system as a whole.

Co-operation and co-ordination imply at least some awareness of the resources available and one way of ensuring this is to have adequate national statistics on libraries. Statistics on Australian libraries do of course exist but none of the current sets of figures cover all library sectors and most deal with one type of library in one state. These sets of statistics are not comparable over a range of libraries or over time. The statistical supplement to Australian Academic and Research Libraries, published annually since 1960, provides the most detailed statistics on a national level but is restricted to academic libraries. Public library statistics are available in differing forms from each of the state library authorities and in a very general form on a national basis. There are no statistics easily available on special libraries or on libraries associated with technical education or schools. In 1975 the report of the Committee of Inquiry into Public Libraries (a federal government inquiry)[1] noted that the lack of current and comparable statistics was a major obstacle in their investigation.

Although the need for reliable national statistics had been apparent to the Australian Advisory Council on Bibliographical Services for many years the census project dates back to 1977 when D.H. Borchardt presented a paper to AACOBS Standing Committeee. Borchardts paper pointed out the need of AACOBS working parties for relevant statistical data on library resources, both bibliographic and human. The Census of Library Services in Australia is conducted by the Task Force on Library Statistics, a working group of AACOBS. Borchardt became Convenor of the Task Force and the first census was conducted in 1980.

Two major problems encountered in the first census were very apparent. (A full outline of the experiences and difficulties is given in an article by D.H. Borchardt[2]. The lack of previous national surveys and the absence of any standard on library statistics created the first problem; a diversity in the methods used for recording data. The second problem and a somewhat disillusioning one, was the poor response rate to the questionnaire.

Lack of uniform methods of counting affected the response to virtually all the questions asked. Unbound serials, for instance, are variously counted in Australia by number of issues, length of shelving occupied, bibliographic volumes, number of cardboard boxes filled and many other methods. The

lack of standards has also confused the counting of microforms. Some libraries count monographs as such, regardless of form, others record microforms in volume equivalents and others count number of pieces of fiche and reels of film. Given that the questions in the first Census asked for data in a specified form, for many libraries the requested data were not readily available and two sources of error occurred. Often estimates were made rather than actual counts and often the figure available was given despite being in different units to those requested, leading to inaccuracies when the data was aggregated. The differing counting methods are not of course just varying degrees of eccentricity on behalf of librarians, different statistics have relevance for different types of libraries. For public libraries the number of monograph volumes is more relevant while for special libraries the number of titles is more meaningful.

This diversity of counting methods obviously had an effect on the response rate. If a librarian has to recount the entire stock of the library because questions are in measurement terms not used in the past, the likelihood of achieving an accurate response is diminished. The other factor affecting the response rate is of course the large and ever increasing number of questionnaires arriving on a librarian's desk. The average librarian has difficulty distinguishing between the important surveys (one's own) and those of lesser importance (other people's).

The approach to the second census is described as pragmatic because many of the theoretical issues concerning the information that should be collected and what form that information should take, have not been resolved. Borchardt, in his article, asks the question "what constitutes a bibliographic item?" A further question follows; on what basis should bibliographic items be differentiated? While these and other questions need to be answered before an ideal picture of Australian library resources can be presented, the questions facing the Task Force conducting the second census are of a more practical nature. Which items are counted and how are they counted?

The objectives of the Census of Library Services, as determined by AACOBS Standing Committee are :

1. To establish in quantative terms the extent of library resources in Australia, and the distribution of those resources as between the various types of library.

2. To establish the extent of library use in Australia in so far as it is reflected in loans made direct to the users of the different types of library.

3. To establish some reliable figures relating to inter-library loans in Australia: especially to establish which are the net lenders and which are the net borrowers, and the extent of the deficit/surplus in the inter-lending business as between major library and type of libraries.

4. To establish, with regard to each type of library, a statistical data base which will enable judgements to be made about the opening hours of libraries; the number and type of staff employed in them; the amount of money expended annually in recurrent mode; and the amount of money expended annually in capital mode.

5. To enable comparisons to be made, on the lines indicated in 1-4 above, between various individual libraries.

The major constraints on the survey are associated with ensuring accurate data and a satisfactory response rate. These broad constraints give rise to a number of specific issues

1. Data requested should be readily available. Data not easily obtained by the respondent can give rise to inaccurate estimates or a refusal to complete the questionnaire.

2. The questionnaire should be reasonably brief and easily understood.

3. Definition of data requested should be precise and applicable to the range of library types involved.

4. Given the census is to be conducted on a triennial basis any inter-census comparisons should be in areas not showing marked annual fluctuations.

The second census will collect data in four main areas;

- library stock
- user population and loans
- staff
- finance

A pilot survey of 100 libraries has been conducted to test question design and to gain further information on methods of counting used. The difficulties highlighted by the pilot survey are discussed under the four main sections of the survey.

1) Library Stock: In an attempt to cater for variations in counting methods the pilot survey offered options for most of the stock questions.

For Monographs, for example, the options of number of titles or number of volumes were given. Although this practise has two disadvantages, it complicates the questionnaire and makes necessary the use of an arbitary conversion factor before the data can be aggregated, there are however,some items of stock, such as unbound serials and microform for which options will be necessary.

Defining types of stock has two conflicting requirements. While the generally accepted definitions of monographs, serials etc are necessarily precise they may not be easily comprehended by unqualified staff, and there are many special libraries and public libraries in Australia without professional library staff. The Task Force will have to attempt to formulate definitions both precise and easily comprehensive.

Given the uncertainty of funding for most libraries it is not planned to include questions on additions to stock in the census year as this is subject to considerable annual fluctuation.

2) User Population and Loans: User population presents minor problems of definition for joint use school/community libraries and for academic libraries open to the community. Questions on loans were divided into direct loans and inter-library transactions and further subdivided into various categories. The level of detail requested is particularly relevant to the current debate in Australia over charging for inter-library loans. The detail requested for inter-library loans was generally not available in public or special libraries but was available from the major libraries involved in inter-library transactions.

3) Staff: The major problem encountered when designing the pilot survey (and responses to the questionnaire showed the problem was not fully resolved) was one of defining mutually exclusive occupational categories. Defining librarian on the basis of qualifications held, results in omitting numerous competent practising "librarians" who hold their positions on the basis of long experience in the library industry. Also in the current employment situation there are, unfortunately, qualified librarians working in clerical positions. Defining "librarian" on the basis of position occupied deals with this problem but creates difficulties in defining "other professional" positions if qualifications are removed as a basis for differentiation. The pilot survey included categories "support staff for library services" and "other staff". Unfortunately the line between "support staff" and "other staff" is not clear and the categories may need to be amalgamated.

4) Finance: Two problems arise with a library's income and expenditure. The first is that many libraries are part of a parent organisation and a breakdown of expenditure by the library, on the basis requested in the questionnaire, is not available. The second problem is that the normal breakdown into subdivisions of operating and capital expenditure does not result in mutually exclusive categories. Expenditure on stock acquisition can be made from either operating funds or one off grants that would normally be regarded as capital funds. The breakdown used in the pilot survey was

   i) Salaries and related expenditure
   ii) Acquisition of library stock
   iii) Operating expenditure (eg maintenance, equipment, stores, overheads)
   iv) Other expenditure - new buildings and sites
   other - major or new one off purchases of equipment, installing automated systems etc
   v) Total library budget (Note question 6 should equal the sum of Questions 1 - 6)

Obviously "Other Expenditure" corresponds closely with capital expenditure but it avoids the problem of tying expenditure to the type of income. Where information was available these questions were well answered in the pilot survey.

Given a well designed questionnaire there still remains the problem of encouraging librarians to complete and return the survey form. A sample survey can be effective even with a low response rate (assuming no bias in who responds) but a census lacks credibility if there is a significant non-response rate. For the second Census in 1983 responsibility for distribution of questionnaires to approximately 3,000 libraries, queries and chasing up non-respondents is with a census organiser in each State of Australia. It is hoped that by splitting the task more time will be available to ensuring a high response rate.

The need for a set of national library statistics was raised at the beginning of this paper. The specific uses of the data were, however, not discussed and it has been of concern to the Task Force that the concentration on techniques of designing and conducting the survey is resulting in the overshadowing of the basic purpose of the Census; that is to provide useful information for those involved with libraries.

John Brockman of the Western Australian Institute of Technology conducted, in 1981, a survey on the uses made of the Australian Academic and Research Library statistics.(3) The results, some of which were quite unexpected, will be used to modify the type of data collected in future

years. It is thought that this approach could profitably be used by the compilers of many of the sets of statistics that are available. The Task Force is considering including a supplementary questionnaire with the Census to determine possible uses of the data collected and to discover in what areas potentially useful data is lacking.

Work on the Second Census and the results of the First Census further emphasised the need for an Australian standard on library statistics. It would be desirable to have an Australian standard conform as far as possible to the ISO/IFLA standard on library statistics but there are many points in the international standard that would not be generally acceptable to Australian librarians. If the ISO/IFLA standard is to be revised members of the Task Force would welcome the opportunity to participate in dicussion on the matter.

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IFLA SECTION ON STATISTICS

NETWORK STATISTICS

Statistical Model for Data Analysis and Networks

by

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1. Introduction

2. Network Hierarchies and the Library User

3. Collection of Statistical Data

4. Network Performance Measures

5. Statistical Model: The Network Quotient

1. Introduction

The proliferation of networks is defined in terms of their hierarchical relationships. Network evaluation is viewed as a threefold process: collection of appropriate statistical data, creation of ratio level performance measures, and use of an objective model to compare one network with another. Network performance is defined in terms of quantifying services to users. Rouses' model is suggested as a viable vehicle for network evaluation. It is further proposed that a network quotient score be created as an impartial and easily understandable measure of network performance.

In concluding his fine book on evaluating the performance of libraries, John Blagden cites Don Revill who has challenged us with the following premises:

" 1) You cannot do research in librarianship;
2) and if you can:
i) it should not be called research; and,
ii) it cannot be generalised to any other library or situation;
3) but if it can no one does so because they cannot understand it;
4) and if they did they would not accept it;
5) and if they did they would be deluding themselves because it would not work" (1).

Nonetheless, key issues confront us in the establishment of performance measures useful in the evaluation of networks. It will be assumed here that the evaluation of library networks will be similar to the evaluation of libraries. This may be a faulty assumption but it is based on the proposition that library networks and libraries share common goals.

The evaluation process has three essential components: the collection of appropriate data, the creation of objective measures of performance, and the use of a model for data analysis which allows for an equitable comparison of networks. Before these topics can be addressed, two other issues need attention: what are the levels of network hierarchies and from what perspective should networks be evaluated?

2. Network Hierarchies and the Library User

The concept of library networks has deep roots in librarianship. Specific examples of coordinated acquisitions among libraries was mentioned in the 1926 Survey of Libraries in the United States and instances of such cooperation were cited which began in the late 19th century between New York Public Library and Columbia University (2). Later, S R Ranganathan had identified three areas of interlibrary cooperation: "standardisation of practice; interlending of resources; and interlending of staff (3). By 1948, Carleton Joeckel and Amy Winslow had proposed a plan for public libraries in the United States which called for the development of large library systems as an efficient means to centralize resources in the provision of services by smaller units (4). The concept of a network continued to develop with the impetus of the Library of Congress MARC program and the corresponding development of OCLC. The 1970 Ranganathan lecturer, Pauline Atherton Cochrane, put networks in perspective by relating them to the fourth law: save the time of the reader (5). It is that perspective which will be used here in proposing a model useful in the evaluation of network performance.

The international proliferation of networks during the past decade leads us to believe that networks, in and of themselves, are beneficial to libraries. It is further assumed that networks benefit the users those libraries serve. Such benefits need to be quantified at each stage in the network hierarchy. For example, measures are needed to assess the effectiveness of large scale cooperative computer facilities. OCLC is notable in assessing its system performance by issuing two regular reports: OCLC System Condition Reports and a weekly Availability and Response Report. But OCLC normally serves libraries through other networks which are regionally based. In turn, these networks (e.g., multitype cooperative such as PALINET and SUNY/OCLC) are at the second level of the hierarchy and they need evaluation which differ from the mechanical measures developed at the main computer facility.

At the third level of the hierarchy is the library system which could serve the public libraries of one or several counties. The fourth level of the hierarchy is the local library and at the last level is the object that all of this is being directed at: the library user.

The need for evaluation at each level of the network was clearly articulated in the papers presented at the 1976 Pittsburgh Conference on Resource Sharing in Libraries (6) and this was reiterated at the 1977 IFLA/UNESCO Seminar for Librarians from Developing Countries (7). Yet, half a decade later we are still in a quandary over the performance measures to use and the statistical methods to employ in a thorough evaluation of a network's impact on library users. Two major obstacles inhibit progress:

1) the collection of appropriate statistical data useful in creating ratio level performance measures; and,
2) the method of data analysis needed to compare one network's performance with another.

3. Collection of Statistical Data

Dante should have reserved a special place in purgatory for those individuals who create committees to discuss library statistics. In a search of the Bowker Annual over the past fifteen years, scores of articles were found which identified some group or other proposing the national or international collection of library statistical data. At this year's American Library Association convention in Philadelphia, the Committee on Research held a meeting with representatives from six major agencies to discuss "A National System for Collection and Publication of Descriptive Statistics about Libraries." At the start, it was agreed that one of the most important aspects of collecting data on libraries was the definition of terms. This question is one we have all confronted: what is meant by a volume, a title, a circulation? Although the definition of terms is considered by most to be an essential component in collection reliable numbers which have external validity, our preoccupation with this phase of research has hindered our ability to evaluate libraries and networks in a timely manner. Even when terms are fully defined, those who report the numbers are often <u>not</u> informed if or how the data will be analyzed. Further, there is a compulsive tendency to collect far too many numbers with little consideration for how such data would be used in the evaluation process.

There are two broad categories of statistical data which could be collected on networks. The first category of data encompasses internal characteristics of the network: its budget, staff size, its services, and even the mechanical aspects of its computer. These are usually referred to as inputs since they are concerned with internal resources. A second category of data—outputs—are concerned with the services the network offers to the user. This would encompass the time it takes to obtain materials, the time it takes to answer reference questions, the availability of materials for use or circulation, and related statistics on the provision and use of other information services. The relationship between these inputs and outputs is often used in constructing cost-benefit models. If the ultimate goal of the network is to increase service to the user, then output measures deserve our full attention during data collection. The only input measures of any value are the total cost to belong to the network and the total budget of the network to perform its operations and services. Finally, it is doubtful that much data are needed to evaluate network performance. The statistical data collected from libraries are most useful when several data elements are combined to form ratio level performance measures. Such measures adjust for the disparate sizes of the libraries or networks in terms of the number of individuals served or the varying sizes of budgets (e.g., circulation per capita or income per capita).

4. Network Performance Measures

In an excellent text on networks, Rouse and Rouse identify three performance measures for individual libraries or library networks:

" 1) Probability of satisfying a request for services.

2) Average waiting time to satisfy a request.

3) Average cost to satisfy a request" (8).

These measures are then related to each other in a single model at various levels of complexity. At each stage of the model's development is the "improvement of services to the library patron" (9). Quite frankly, it would be difficult to improve upon this model and it is offered here as a general yet simple representation of network effectiveness. The model incorporates user satisfaction and time of the transaction process while adjusting for cost at various service levels. This model is appropriate to evaluate network performance at each stage of the multi-tiered network hierarchy.

Data from other variables may also be collected to create performance measures. An alternative to Rouses' model is suggested by The Centre for Interfirm Comparison in Great Britain (10) where public library system data were used to create ratio measures which related costs to resources and services. Although this model is far more detailed than the Rouses' model, it does allow for a realistic and understandable computation of staff productivity levels in terms of user related services.

It would be easy at this point to suggest a dozen performance measures useful in the evaluation of networks. Each of the measures might require collecting two, three, or four separate pieces of statistical data which could originate from the network, the library, or the user. But this would defeat the point that is being made: the simpler the model, the more powerful the evaluation—provided the measure is grounded in assessing service to the user. The Rouses' model appears to fulfill this requirement.

5. Statistical Model: The Network Quotient

Once the performance measures have been developed, then a statistical model is needed to provide for an equitable comparison of one network with another. Simply reporting that it costs User A five days to receive interloan materials in one network and 3.5 days in another network does not give us a clear picture that the second network is superior to the first. Usually, two techniques are used to evaluate performance on each measure:

1) ranking the networks from best to worst; or,
2) comparing each network to the mean score of all networks.

The ranking method is worthless since it does not account for the actual distance between ranks. If 100 networks were spread across 100 ranks, then it would be assumed that there is a great difference between rank 25 and rank 75. In point of fact, if the data distributes normally, each of these networks may fall within one standard deviation of the mean. It is entirely possible that there is not a significant difference between the performance of two networks who would achieve ranks 25 and 75 respectively.

The second method to evaluate performace scores--comparison with the mean--is also faulty since it does not take into consideration the total distribution of scores. If it takes the average network five days to satisfy an interloan request, then how do we evaluate a network which takes seven days or nine days or fifteen days to perform this same task? The mean of a distribution only has meaning when we account for the total dispersion of scores, i.e., the standard deviation. Standard scores (or z-scores) can be used as an impartial yardstick in comparing network performance on any particular measure. If the mean for interloan is five days and the standard deviation is two days, then any network taking more than nine days to satisfy a request is performing in an inferior manner and they are wasting the time of the user. If these data are normally distributed, then such a network is two standard deviations from the mean and is in the extreme tail of the distribution. (The mean is five days, one standard deviation from the mean is seven days, and two standard deviations from the mean is nine or more days.) It can reasonably be concluded that the network taking nine days has a percentile score of 2.5; thus, 9715 percent of the networks perform better on interloan services. The standard score method takes into account the mean and the distribution standard deviation in a single score.

This situation is analogous to the evaluation of individuals in terms of standardized tests. When a student takes an IQ test or a college board examination, his score is expressed in standard score format which represents his distance from the group mean. Thus, if an average individual takes an IQ test and scores on the group mean, then his standard score is zero. This is then arbitrarily set to a score of 100. If the individual scores one standard deviation to the right of the mean, then he is given a score of 100 plus 15 which equals 115.

One standard deviation to the left of the mean is 100 minus 15 which equals an IQ score of 85. The bell shape of the normal distribution indicates that 68 percent of all individuals taking IQ tests will score within one standard deviation of the mean (i.e., they will be given scores between 85 and 115). Any individual who is two standard deviations from the mean—lower than 70 or above 130—is treated as an exceptional case since such persons are in the bottom 2.5 percentile or the top 97.5 percentile.

It is suggested here that a similar standard score method be used to give network performance measures meaning. Thus, an average network would score at 100—the 50th percentile—on any given measure. Those networks scoring below 70 would be rated as having an unacceptable performance while those scoring above 130 would be commended. In a study of public library performance measures, it was found that all ratio measures of input and output characteristics were normally distributed (11). This suggests that performance measures for networks may also be normally distributed. It should be noted that the standard score method does not require a normal distribution for it to be used as a evaluative technique. For want of a better name, this method to evaluate performance measure scores could be termed the network quotient.

Finally, the evaluation of networks rests on sound data collection activities. But these activities are often subverted by an overconcern for unnecessary statistical details. Instead, it might be best to concentrate on a very small number of performance measures. Each of these measures should be assessments of how the network serves the user. Use of the network quotient should facilitate the impartial, objective comparison of one network with another. When this is accomplished, then we may be fulfilling the spirit of Ranganathan's fourth law: save the time of the reader. In the long run, it may be possible that you can do research in librarianship which can be generalized to other libraries which can be understood which may be accepted and which might work.

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IFLA SECTION ON STATISTICS

Network Statistics

Viewpoint of a Network Administrator and a University Library Administrator

by

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1. Introduction

2. Levels of Network Statistics

    a. Operational

    b. Performance

    c. Analysis of Output Products (machine readable tapes)

        1. Computed

        2. Derived

3. Development of Library Decision Support Procedures

4. Results Obtained to Date

5. Problems

    a. Definitions and Standards

    b. Maintenance of Data and Tables

    c. Continued Investment in Development

    d. Acceptance by Community

6. Conclusion

1. Introduction

The paper briefly reviews the availability of statistical reports from the major U.S. bibliographic utilities, and describes the use of the OCLC distribution tapes as a source of management data. Particular emphasis is placed on the contribution such data make to an overall academic library decision support system through their correlation with data from other sources. Some preliminary results obtained from work performed at State University of New York Central Administration are reported. Finally some problems met in these developments are described.

2. Levels of Network Statistics

It is proposed that Network Statistics be grouped into four levels, viz operational, performance, computed from output products, and derived through combination with other, external data.

Operational Statistics are generally maintained for internal management purposes by the utilities, but many data are released for network and user information. Such data as numbers of records on file, hours of service available, response time at different time periods, message traffic, and records added in a given time period are routinely distributed to network participants.

Performance Statistics are also routinely distributed, usually monthly and annually. Often the statistics are by-products of billing and accounting procedures, and they provide both regional networks and individual libraries accurate measures of subsystem utilization - and under-utilization. Another class of statistics which is extremely valuable is analyses of the composition of the online file by such elements as physical form, imprint dates and languages.

Both operational and performance statistics are very valuable. Both could be further expanded to provide more data to libraries.

Data computed from analysis of distribution tapes are data gathered by analysis of records of local library holdings represented on their own and/or regional network tapes. SUNY/OCLC and AMIGOS are two examples of regional networks affiliated with OCLC which provide such services. It is important to note the essential difference between records available on local tapes and the master file at OCLC. The local tapes contain purely local data, which may be in addition to, or may replace, data on the master file. Such elements as holdings and location statements, local call numbers, bibliographic notes, and subject headings will appear with master record data. Otherwise, the record is the same, including fixed field codes.

These tapes are obviously a rich source of data for local management studies. Apart from extended analyses of content utilizing fixed field codes, two specific analyses have great value. The first is an overlap analysis, which reports the uniqueness or commonality of the co-occurrence of the holding of a particular title within a set of libraries. The second is the extension of the overlap analyses through the 550 disciplines of the United States Office of Education National Center for Educational Statistics Higher Education General Information Survey (HEGIS)

Taxonomy. This study is performed by SUNY/OCLC using conversion tables developed by that network which express all the HEGIS Taxonomy terms as subsets of L.C. Class Numbers (1)

Derived data are those management data which are obtained when the output results from the tape analysis data are combined and correlated with such external elements as publishing data, academic mission and enrollment data, and use data from circulation and interlibrary loan systems.

It is noted that all the data used in the derived analyses are machine-readable by-product data from other systems which routinely generate such data, and are not the results of specific surveys or questionnaires. Sample data may be used, however, rather than complete files.

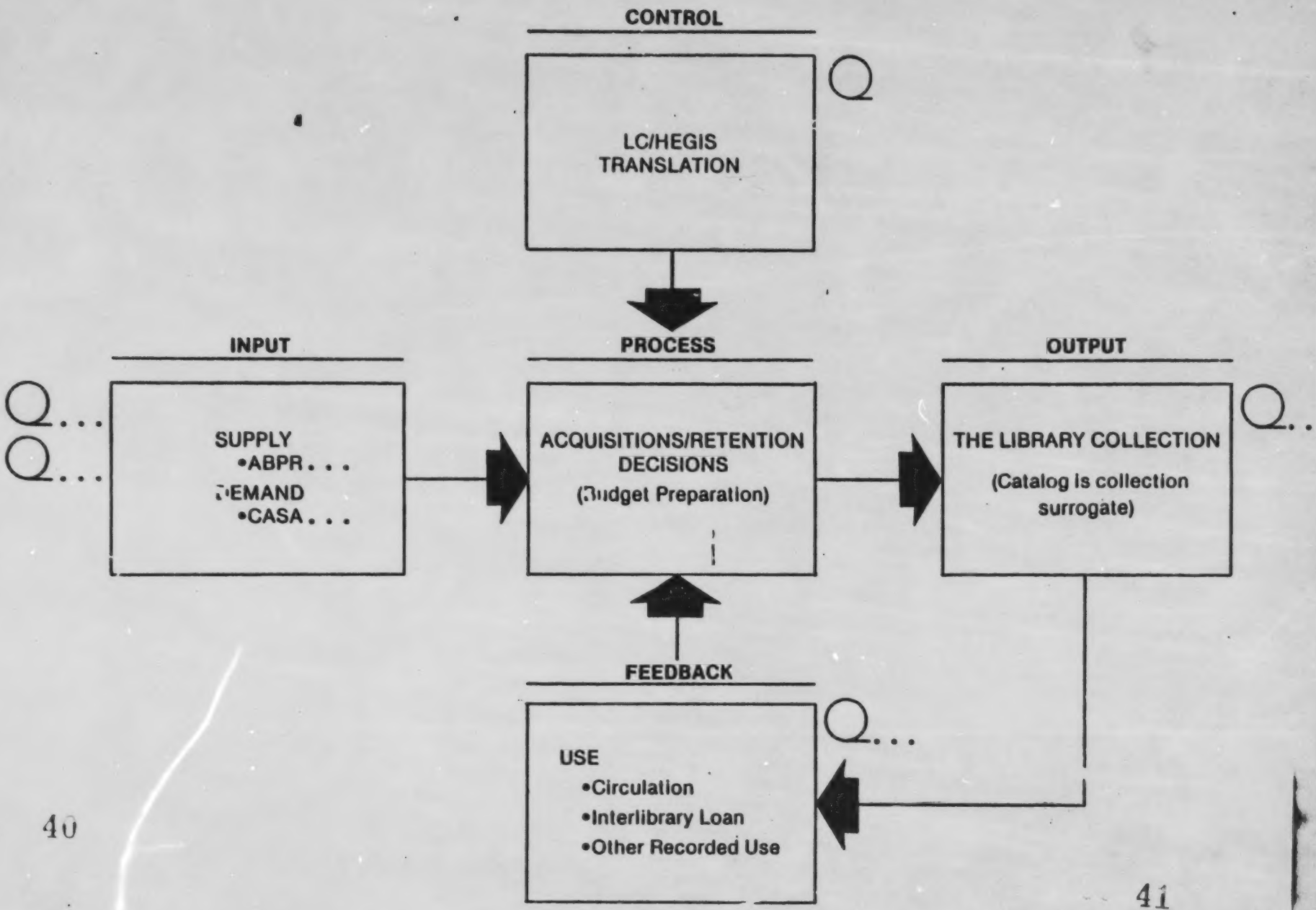
It is this author's view that the derived data will make a very important contribution to academic library management.

3. Development of Library Decision Support Procedures

The chart on the following page describes the structure of a management information system which concentrates on the collection item and retention decision in an academic library. Using computed and derived data as input, it is quite possible, using modelling programs, to elevate the system to a decision support system.

The system is currently under development at SUNY. In its present state, cataloging data can be correlated with academic data. Work is in progress on the integration of publishing data, using Bowker tapes as input. As interlibrary loan and circulation transaction tapes become available they will be integrated into the system as the feedback loop, but they will not be available for some time. Concurrent work is reviewing the status of decision support modelling programs with a view to selecting a set for adoption by the system.

Although the work is progressing well, it may be 1985 or 1986, before it can be considered complete in its first phase. Then it will be possible to start revising and improving the system. (3)


CONTROL
LC/HEGIS
TRANSLATION
INPUT
PROCESS
OUTPUT
SUPPLY
•ABPR . . .
DEMAND
•CASA . . .
ACQUISITIONS/RETENTION
DECISIONS
(Budget Preparation)
THE LIBRARY COLLECTION
(Catalog is collection
surrogate)
FEEDBACK
USE
•Circulation
•Interlibrary Loan
•Other Recorded Use

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4. Results Obtained to Date

A number of analyses and correlations have been performed on selected groups of libraries, primarily within the SUNY/OCLC Network with the following major results.

a. In a group of 10 four-year colleges within SUNY, an overlap study of 1977 and 1978 Monographic imprints cataloged between 1977 and 1979 showed that 56% of the 45,000 titles were represented only once in the set, (i.e. were unique), that 18% were represented twice, and that only 171 titles (0.2%) were found in all 10 institutions. All these institutions are very alike academically, with a 30% concentration on education, with basic baccalaureate degree programs, and a small percentage of post-graduate programs.

b. In the same study, correlation between the % of academic effort (expressed as student credit hours) in the 10 major academic discipline groups of HEGIS, and monographs acquired by the libraries to support those programs, showed almost exactly the same distribution of effort among all campuses, despite the variation in size from 3,500 students to 10,000 students. For example, SOCIAL SCIENCES acquisitions percentage was almost twice the percentage of Student Credit Hours in those disciplines.

c. Again from the same study, it was found that acquisition effort, expressed as titles acquired, and student credit hours taught, had very strong relationships in some disciplines, in some cases with correlations greater than 0.9. Examples are biological science, health professions, mathematics, and physical sciences. Again this is true regardless of the size of institution.

The overlap studies ((a) above) have been repeated with the same libraries and with other groups of libraries and the results of high uniqueness and low commonality confirmed. It appears these results can be accepted and expected. The other studies have still to be repeated. If they are also confirmed it will raise a set of very interesting further questions; if not, another set of interesting questions will also follow.(4)

It is reasonable to draw the following conclusions based on existing results:

1. Basic bibliographic network data can be analyzed and manipulated to produce valuable management information for a single, or set of, academic libraries.

2. It appears that the macro decisions within collection development policies tend to consonance regarding distribution of funds; and that great

variety is found when it comes to the selection of specific titles within any discipline, depending on the specific emphasis in the academic mission of a particular campus.

3. Leading from 2 above, a set of smaller colleges within a region, if sharing the same bibliographic network and using the ILL and online catalog components, may have at least as strong a combined resource as a major academic resource library.

4. Work should continue to validate or disprove the preliminary results, and incorporate missing data elements into the decision support system.

5. Problems

a. Definitions and Standards

The endemic problem of statistics within management data of course occur in this work. Where the data used are from the network, they adhere to national bibliographic standards; but there are no national standards for the reported statistics. The HEGIS data is standardized; but the L.C./HEGIS conversion tables are a SUNY construct which have not yet been subject to standard review. Many of the publishing data which will be used are standard; many not. Circulation and ILL transaction data are still subject to the standards process.

As the standards work progresses, it is hoped that the investment in such systems as those described here will be accommodated and accepted by standard developers. We already know, however, that the HEGIS Taxonomy was revised in 1981 and now demands extensive revisions of the programs and tables. On the other hand, since all academic institutions are affected by this change, it may be possible to participate in a general revision of programs.

b. Maintenance of Data and Tables

Neither the data nor the tables are static. The HEGIS/ILL tables are particularly volatile as the tables are revised based on user feed back; as HEGIS evolves; and as L.C. adds to and revises the class schedules. As the system continues, a portion of income derived from the operation must go into table maintenance as well as program and general software maintenance.

c. Development Support

The early work on this project was supported by two small federal grants in 1977 and 1978. Since then, it has not been possible to attract external support other than one year of work on the derived data supported by State University. All expenditures have therefore been taken from the operating budgets of SUNY/OCLC with the expectation of provision of service for a fee to other libraries and networks. This has considerably slowed the development timetable, particularly in the performance of repeat and extended studies using the existing generalized software.

d. Acceptance by Community

The phenomena of fear of the results and apprehension regarding their application found by developers of decision support and management information systems in business and industry are found at least as strongly in libraries and among academic administrators. Keen (5) describes typical responses as 'social intention, resistance, and counter-implementation'. The fear stems from a fundamental misunderstanding of the purpose of decision support systems, which King (6) defines as 'A computer-based system that the administrator uses to amplify or improve judgement. It is not a system that makes decisions.'

It is difficult to be sympathetic to such attitudes in that they betray an individual uncertainty about libraries' fundamental purposes and achievements. It is an irony that many who have been reluctant to process their data have found the results to be extremely supportive of their efforts.

Of course, new data challenge old assumptions and attitudes; but is that not what a profession does? Better to be prepared and stimulate change than have external forces thrust it, ill formed and ill considered, at libraries. This reluctance to inculcate and embrace change is leading to diminished (or absent) funding support for development, and loss of opportunity. It seems to take as many of three or four years before many are able to incorporate important data into the decision process; and this in an extremely volatile society.

In short, as much, if not more, effort has to be put into the education of colleagues and administrators as in the development of systems themselves. An interesting development is the exchange of processes among networks, as bibliographic utilities contemplate the use of these systems or their master files, thus contributing to the acceptance of the decision support process.

6. Conclusions

This paper demonstrates the current and potential value of network statistics, and in data derived from network by-products, in academic library management. Statistics are available in various forms from all the bibliographic utilities; and some groups and researchers are developing management systems which utilize these data. One rich area for development is the correlation of machine readable data form networks with machine readable data derived from other sources to create an academic library decision support system. Work in this area, at SUNY, with some preliminary results and development projections, are reported.

Considerable difficulty in accepting and integrating the results into individual institutional strategies and processes is noted and expected.

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RE

ASPECTS OF LIBRARY STATISTICS IN BRAZIL*

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1. INTRODUCTION

In a meeting of the IFLA Section on Statistics it would be redundant to speak about the paramount importance of library statistics for evaluating and planning library activities at local, national and international level. Nevertheless, in developing countries statistical data on libraries can also be one of the measures of the stage of cultural development of the country.

In this respect Unesco has played a fundamental role and Brazil can be given as an example of how important the 1970 Recommendation was for the standardization of national library statistics.

This paper briefly reports the way Brazilian librarians envisage library statistics and how and by whom these statistics have been collected, disseminated and used.

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2. LIBRARY STATISTICS IN THE BRAZILIAN LIBRARY LITERATURE

A search in the national bibliography of librarianship is a reliable way of finding out how library statistics have been considered in Brazil.

In 1960, the former Brazilian Institute for Bibliography and Documentation (IBBD) published the first volume of the Brazilian Bibliography of Documentation, covering the period 1811 to 1960. Among the 1.129 references of the Bibliography, only one deals with statistics: it is a paper published in 1959 describing the tasks performed by a documentation centre specialized in Statistics.

The second volume of the Brazilian Bibliography of Documentation covers the years 1960 to 1970. Its KWIC index lists 12 titles with the word "statistics". Nine references are descriptions of activities of documentation centres either specialized in Statistics or dealing with statistical documentation. Two are bibliographies of agricultural statistics publications. One is a dictionary of statistical terms.

The third and fourth volumes of the Brazilian Bibliography of Documentation, published by the organization that succeeded IBBD - the Brazilian Institute for Scientific and Technical Information - covers the period 1971 to 1977. Its subject index includes the headings "library statistics" and "loan statistics" with five references, besides a document on statistical evaluation. The first two papers provide statistical data concerning some university libraries and

suggest a few indexes for evaluation purposes. Another document mentions the importance of library statistics for evaluating and planning library services, and recommends the adoption of the 1970 Unesco Recommendation concerning the international standardization of library statistics. The other three references are translations into Portuguese: one is an article by Frank Schick on international library statistics and the other two are the text of the Unesco Recommendation.

The fifth volume of the Brazilian Bibliography of Documentation covers the years 1978 to 1980. Its subject index includes the headings "statistical analysis", "statistical indicators" and "statistical surveys" with a total of 20 references. Five of them deal with statistical indicators of scientific and technical communication. Four are not directly concerned with statistics. Another four are devoted to internal statistics and their individual use and evaluation. Two deal with problems of collecting data within the library in relation to national and international library statistics. Another two are concerned with measures of science and technology activities. One is a bibliometric study. Another is again a translation into Portuguese of the 1970 Unesco Recommendation. Another one presents an analysis of the Brazilian libraries based on national library statistics.

Of all these documents, twelve have been selected as the most meaningful for the purpose of this report.

The first aspect they reflect is the development of the subject throughout the years, as following: two documents published in 1971, one in 1972, one in 1973, two in 1976, one in

1978, one in 1979 and four in 1980. They also show that the first documents specifically devoted to library statistics appeared exactly eleven years ago, in 1971 (1, 2), i.e. one year after the 1970 Unesco Recommendation. The paper published in 1972 mentions for the first time the Unesco Recommendation(3). The document issued in 1973 was a translation of the Frank Schick's article on the Unesco Recommendation. The two papers of 1976 are also translations of the same Recommendation. In 1979 appears the fourth relevant paper on library statistics by Brazilian authors, including a survey among libraries about the collection of statistical data (4). In 1980 the subject flourishes and four relevant papers are published. The first one explains the importance of statistics for library planning and management and claims for international standardization (5). The second is a thorough study on how individual library statistics may be used to define minimum standards for library services (6). The third deals not with library statistics but with a closely related topic: Brazilian production of books, periodicals and other primary publications (7). And the fourth is devoted to the analysis of Brazilian libraries based on national library ststistics (8).

It must be noted that most studies, like the ones in 1, 2, 4 and 6, are based on information collected from statistics and questionnaires filled in by the libraries investigated. Only two studies (7, 8) have used existing statistical data collected at national level published in the Brazilian Statistical Yearbook, for purposes of national library and information policy making. But certainly these

data have been used in other publications not indexed under "library statistics" in the Brazilian Bibliography of Documentation - such as the study published in 1978 on Brazilian publishing activities (9) - as well as other works published in the press, in internal reports, etc.

Anyway, the increasing importance of the topic is undeniable. In January 1981 a national seminar on university libraries devoted a whole session to library statistics. Therefore, in spite the fact that libraries in Brazil have always collected their statistical data for individual use, it seems also undeniable that the 1970 Unesco Recommendation concerning the international standardization of library statistics has had a decisive influence in the development of library statistics as a subject of reflection.

3. COLLECTION OF NATIONAL LIBRARY STATISTICS

The Brazilian Federal Constitution sets forth a National Statistical System. A 1974 law assigns to the Brazilian Institute for Geography and Statistics (IBGE) - subordinate to the Minister of Planning - the functions, among others, of producing statistical information directly and of coordinating the technical activities of the organizations belonging to the National Statistical System.

The organization responsible for national library statistics is the Ministry of Education and Culture, through its Service for Educational and Cultural Statistics. Questionnaires are distributed by the data collecting units of IBGE all over the country. Data are processed by the

Ministry of Education and statistics are disseminated through the Brazilian Statistical Yearbook published by IBGE. In 1981 an agreement was made between IBGE and the Ministry of Education, and representatives of both organizations were appointed, to form a Special Committee aiming at the improvement of educational and cultural statistics.

There is another unit of the Ministry of Education concerned with library statistics. It is the National Institute for the Book (INL), whose objectives are to foster publishing activities in the country and to help public libraries by supplying them with books. A contract was made between IBGE and INL for a survey about libraries throughout the country. Results were published in two volumes: the first is a directory of the 14.884 libraries surveyed; the second volume is a very complete set of graphic displays and statistical tables showing the situation of those libraries in 1976 (10). The collection and publication of these statistics were based on the 1970 Recommendation of Unesco regarding library statistics, although many other data were collected as well.

4. DISSEMINATION OF NATIONAL LIBRARY STATISTICS

Library statistics in Brazil have been gathered and disseminated at national level since the beginning of the century. The first volume of the Brazilian Statistical Yearbook was published in 1916, containing data on Brazilian libraries back to 1907.

Statistics from 1907 to 1965 were published almost

every year, with some variations in the way figures are presented. For example, sometimes libraries are classified as governmental and private, or public and semi-public, or according to the year of their foundation. The 1965 data are the first to classify libraries into national, university, specialized and popular. The most consistent information is the size of holdings given in number of volumes (and never, not even more recently, in length of shelving in metres).

After 1965 library statistics were published every three years, with figures for 1968, 1971 and 1974. Brazil adopted the 1970 Unesco Recommendation as soon as it was issued and since then its definitions have been taken into account for many purposes (10).

5. USE OF NATIONAL LIBRARY STATISTICS

As already mentioned, the search in the Brazilian Bibliography of Documentation pointed out two papers, both issued in 1980, where national statistics were employed as the basis for carrying out research.

The first is an article published in the journal of the Library Association of Brasilia (8) in which library statistics of 1974, published in the 1976 Brazilian Statistical Yearbook, were used. Data were arranged in such a way that differences in the situation of libraries in various regions of Brazil became very clear, particularly when relations were made with the population of those regions and the number of libraries, of librarians, of readers, of books, of new acquisitions, of loans and so forth.

The second study deals with books, periodicals

and other primary publications produced in Brazil (7). It provides the results of the first stage of a research project on statistical indicators of scientific and technological communication in Brazil based on the work carried out in the United States by Donald King for the National Science Foundation(11). A plan for the collection of data was formulated by F. W. Lancaster (12) in a consultancy funded by a grant from the Brazilian National Research Council. The study was developed in 1978 in the former Studies and Projects Division of the Brazilian Institute for Scientific and Technical Information (IBICT). Some of the data used were taken from the Brazilian Statistical Yearbook, which provides statistics on production of books and periodicals every year in accordance with the 1964 Unesco Recommendation concerning the international standardization of statistics relating to book production and periodicals. The study shows that the Brazilian production of primary publications such as books, journals, dissertations and patents awarded is increasing. One of the problems detected regarding the statistics themselves was the subject classification of books by the Universal Decimal Classification. For example, the fact that the new class 8 comprehends Linguistics as well as Literature made impossible the separation of scientific and technical books - such as a treaty on Philology - from poems and novels.

These are only two examples of studies based on national statistics. They demonstrate very clearly how these statistics can reveal the stage of cultural development of a country; how useful they are for managers, planners and the

Government; and how important they are for developing countries.

6. STANDARDS FOR LIBRARY STATISTICS

The national standards organization in Brazil is the Brazilian Association for Technical Standards (ABNT), which is a member body of the International Organization for Standardization (ISO). Among the several Study Committees of ABNT, one is devoted to Documentation and deals with standards drawn up by Technical Committee ISO/TC 46 - Documentation. Brazil is included among the 22 countries that approved the International Standard ISO 2789 - International Library Statistics, dated 1974. However, the text of this standard was never translated into Portuguese nor adapted to become a Brazilian Standard. Maybe this will happen when the revision of ISO 2789, which TC 46 will start soon, is completed and approved.

7. CONCLUSION

There is no doubt that the importance given in Brazil to library statistics has significantly increased with time. It can be assumed, therefore, that Brazil will be able to follow the new developments that are on the way, such as the broadening of library statistics into the wider scope of information statistics. In this respect Unesco is also playing an important role: it is sponsoring a research project aimed at devising the Information Utilization Potential, or IUP index, composed of over 200 statistical indicators published

in national and international yearbooks. It is preparing a Guide to the Collection of Statistics on Scientific and Technological Information and Documentation.

However, the situation of library statistics in Brazil still have to be consolidated. This could be achieved with the general adoption, by Brazilian libraries, of national standards concerning library statistics. But these standards still do not exist. Their establishment was one of the recommendations made by the session on library statistics of the Second National Seminar of University Libraries held in Brasilia in January 1981 (13).

ABSTRACT: An analysis of the Brazilian library literature shows that the first articles on library statistics were published in 1971. Since then the interest in the subject increased due to the influence of the 1970 Unesco Recommendation on library statistics. The organization responsible for the collection of these statistics is the Ministry of Education, which supplies data for publication in the Brazilian Statistical Yearbook of the Brazilian Institute for Geography and Statistics (IBGE). Library and information statistics have been used in studies that produced results useful for national library and information policies.

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Standardization of Statistics: the Experience of the Quebec University Libraries

by

Statistics Task Force
Library Subcommittee
Conference of Rectors and Principals
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ABSTRACT

A statistics task force was created in 1977, by the Library Subcommittee of the Conference of Rectors and Principals of Quebec Universities, to standardize and rationalize statistics produced by the libraries and provided to external agencies. This paper summarizes the problems that led to the creation of this task force, and its activities, accomplishments and future prospects.

A- Creation of the Statistics Task Force

University libraries in Quebec have been actively engaged in inter-institutional cooperation for approximatelly twenty years. The Conference of Rectors and Principals of Quebec Universities was jointly created by the heads of these universities in 1963, and legally established in May 1967 as a non-profit corporation. In order to pursue its numerous objectives relating to the coordination and planning of higher education, CREPUQ maintains a number of standing committees and subcommittees. The "Library Subcommittee" of the "Academic Affairs Committee" exists mainly to support the objective of "promoting and facilitating inter-institutional collaboration and the pursuit of cooperative projects which will lead to the optimal utilization of resources".

The director of libraries from each of CREPUQ's member institutions and the chief librarian of the Bibliothèque nationale du Québec, who has observer status, are members of the Subcommittee. Its mandate is to present to the Academic Affairs Committee recommendations leading to the planned development of, and increased cooperation between, university libraries, and to undertake various cooperative and resource sharing activities aimed at improving the efficiency of their operations. To date the Subcommittee has produced a large number of cooperative project, for example: the establishment of PEBUQUILL, a daily delivery service for interlibrary loans, the creation of reciprocal borrowing privileges for graduate students, faculty and librarians in all Quebec and Ontario university libraries, etc.(1)

The standardization of statistics is another project of the Library Subcommittee and the task force whose activities and accomplishments are described in this paper was created for this purpose in 1977.

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(1) The objectives, activities and accomplishments of CREPUQ, and particularly of the Library Subcommittee, are more fully described in the article by Onil Dupuis: "Les bibliothèques universitaires du Québec et la coopération", Bulletin des bibliothèques de France, t.23, 1978, pp.325-363.

The task force was created by the university library directors to coordinate and rationalize statistics related activity in their institutions. Each year they answer numerous questionnaires for different agencies such as the Ministère de l'éducation du Québec, Statistics Canada, the Canadian Association of Research Libraries, etc.

Because the information required for each questionnaire is not always the same, and because the methodology and definitions differ from one questionnaire to another, the preparation of responses required considerable effort on the part of each library. In addition, given the total absense of coordination in this process, the figures furnished by different institutions were often not comparable, thus rendering these statistics useless for many applications. Insofar as they could serve as a basis for studies which could influence important political decisions, the gathering and publication of these statistics could even be dangerous!

Thus for example in 1978, the authors of a report for a "Comité technique d'évaluation des bibliothèques québécoises", established by the "Direction générale de l'enseignement supérieur du Ministère de l'éducation", deplored the unreliability of university library statistics, the use of which constituted an important part of their methodology.

In response to this problem, the directors of libraries decided to adopt a common statistics questionnaire. The compilation of responses would be coordinated by the Subcommittee itself with the assistance of the CREPUQ secretariat, and from this information could be extracted the statistics required by external organizations. The development of this project was to be carried out by the members of the Statistics Task Force, through the analysis of different levels of statistical information, the development of the methodology and instruments needed to gather the information required, and the compilation, analysis and interpretation of the results.

B- Activities of the Task Force

The Statistics Task Force was created by the Library Subcommittee in 1977. Its initial membership consisted of representatives from three (3) university libraries, one representative from the Bibliothèque nationale du Québec and a research officer from CREPUQ.

The mandate assigned to the task force was: "to precisely identify those statistics which should be provided by the university libraries to outside agencies, and to propose for each statistic a standard definition that would allow the comparison and valid interpretation of the results".

This madate was interpreted by the task force as follows:

a) To identify the statistics for Quebec university libraries required by national and provincial agencies:

   - The Service des bibliothèques d'enseignement of the Ministère de l'éducation du Québec
   - Statistics Canada
   - Canadian Association of Research Libraries;

b) To propose, for each item, a standardized definition that is clear, precise and, whenever possible, based on a definition accepted by international standards organizations;

c) To present to the Library Subcommittee all recommendations necessary to assure the compatibility of the statistics collected with those compiled by external agencies, and to assure that they are conducive to valid interpretation.

The task force adopted the following methodology to accomplish these tasks:

a) To examine and compare the questionnaires used by the principal external agencies involved, and to identifiy the statistical information required;

b) To define each of the statistics identified and to specify the source of the definition adopted;

c) To study the usefulness of each of the statistics identified;

d) To present appropriate recommendations to the Library Subcommittee.

During the first year, the task force used definitions suggested by different national and international organizations to establish the terminology required for statistics identified, and standardized certain statistics collected by the Quebec university libraries for outside agencies. This activity led to the development of a statistics questionnaire which strongly reflects considerations relating to changes occurring at present, or likely to be significant in university libraries in the near future.

Figures which could not be accurately determined in the university libraries, and those that are not significant or do not have a meaningful interpretation in the present university library environment, were omitted from the questionnaire.

In addition, because of the absence of statistics related to reference activity, and the difficulty of developing descriptive statistics for this area, it was recommended that a task force be established to develop the statistics required for evaluation of this type of activity. This task force was created and the results of its activities subsequently integrated into the questionnaire.

As the result of another recommendation, a second task force was created to study the utility of collecting statistics related to the rate of staff turnover and effective manpower in the libraries (measuring absenteeism, etc.). This information was not integrated into the questionnaire, but was the focus of the activities of the task force during its second year.

C- Accomplishments of the Task Force

- Description of The Questionnaire

The questionnaire is distributed annually in two versions: French and English It is made up of almost one hundred and seventy questions, divided into five sections, and to this is appended a list of standardized definitions for approximately sixty (60) terms and a bibliography of sources used in the standardization process. The five sections and their contents are:

1. Information Resources

This section is intended to provide a measure of the size of each library's collections: printed materials (including microforms), audiovisual materials and special collections. Related information, such as data bases used, is also included.

2. Financial Resources

This section covers all expenditures related to the library's operations. It is divided into the following categories:

- operating expenditures: collection development (including binding and data base services), personnel (salaries and benefits), etc.

- capital expenditures: property, furnishings and equipment, etc.

3. Human Resources

This section surveys the distribution of positions in the libraries according to salary level and classification: librarians and other professionals, library technicians and other technical staff, and other categories (clerical and secretarial staff, etc.).

4. Physical Resources

This section includes net library space, seating capacity, availability of reserved study areas, shelving capacity, and major equipment, microform readers, photocopiers, book surveillance systems, etc.

5. Use of Information Resources

This section covers statistics on library attendance, circulation (regular and reserve loans, interlibrary lending and borrowing), in-library use of materials, reference and library instruction.

- Problems Encountered

The questionnaire was adopted by the Library Subcommittee one year after the task force was created. Each university library then took the necessary steps to collect the statistics required for the questionnaire. Thus for the first time, in 1979-80, the libraries could provide statistics for external agencies that were precisely defined, collected in the same way, and, as a result, compatible and comparable.

Naturally the first compilation of the questionnaire uncovered several problems. In the years that followed, the task force made numerous refinements to the questionnaire, such as improving instructions, clarifying definitions, and even removing questions that proved difficult, if not impossible, for the libraries to answer.

The principal obstacles encountered in collecting the statistics required were the following.

1. Certain institutions were slower than others to adopt the questionnaire in their internal statistical procedures.

2. The questionnaire grew out of the desire of the library administrators to increase collaboration and coordination of activities. This desire, however, was not always present at the individual department level within the libraries.

3. The decentralized organizational structure of some of the university libraries made, and continues to make, the statistics gathering process more complex, and results in numerous problems, notably delays in the return of responses to the questionnaire.

Although improvements are continually being made to the questionnaire, there remains room for improvement in its application. The compilation of results is still complicated by the fact that certain institutions have not supplied all statistics required. The lack of human or financial resources in some libraries has greatly increased the difficulties they face in adopting the questionnaire, and thus at this point they are still not able to provide all the information required.

- Presentation and Analysis of Statistics

Since 1979-80 the task force has prepared for the Library Subcommittee tables showing the data available for each institution and the combined total in each category for all libraries. This permits a rapid comparison of the resources (human, physical, etc.) at each institution and also indicates trends in the level of resources and activities, within each library and overall.

In conjunction with its work on specifications for an automated system for these annual statistics, the group attempted a more sophisticated analysis and presentation of the results of the 1980-81 questionnaire. This work was carried out manually to test the usefulness of various types of data on the reliability of different statistics and the quality and level of response. The results of this analysis, although selective, were none the less appreciated by the members of the Library Subcommittee.

This new level of analysis extends the usefulness of the data gathered by making available mathematically derived statistics based on a comparison of different items in the questionnaire and data from other sources, such as student enrollment and university budgets. Some examples, with illustrations from the 1980-81 presentation, follow:

1. Percentage increase or decrease within different categories permits a rapid appraisal of trends in types of materials collected, budget allocation and personnel. Eg.

Percentage increase or decrease in certain categories by university and in total.

Information Resources (physical items)

1.1.3 Monographs

	Laval	McG	Sherb.	MOAH	UQTR	MOAC	MOAR	MOAH	ENAP	ETS	IAP	Media	Poly	HEC	BMQ	McGill	Concordia	Bishop's	Ensemble	Répond
80-81/79-80	7.0	7.2	5.0	7.3	7.0	13.4	1.1	15.5	13.9	(1)	7.1	10.7	2.7	5.3	(2)	7.7	2.9	4.8	5.6 (3)	1

2. Ratios between different categories of collections, personnel, budgets, etc. indicate the relative emphasis placed on different areas in each institution. Eg.

Table II

Relative percentages (physical items) by university and in total, for the years 1980 and 1981

1. Information Resources

1.1.3 Monographs/total print materials (1.3)

	Laval	Mtl	Sherb.	UQAM	UQTR	UQAC	UQAT	UQAR	ENAP	ETS	IAF	Média	Poly	HEC	BNQ	McGill	Concordia	Bishop's	Ensemble	Répondan
1979-80	78.6	77.0	82.1	77.3	32.8	75.1	84.6	89.1	(1)	(2)	16.7	60.8	28.9	68.1	(3)	69.2	91.4	77.5	73.4 (3)	13/11
1980-81	79.0	77.8	82.3	77.6	(1)	76.0	81.9	89.3	(1)	(2)	15.8	57.3	25.9	59.9	30.1	68.4	91.6	72.5	68.0 (4)	13/11

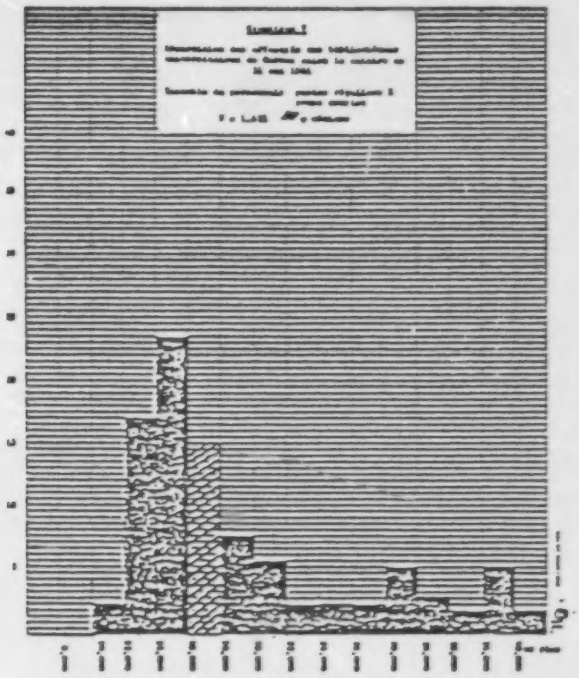
3. The presentation of statistics correlated with student populations and university budgets facilitates a meaningful comparison of resources and activities in the Quebec university libraries. Eg.

V. Use of Information Resources

1. Attendance per F.T.E. student

	Laval	Mtl	Sherb.	Québec-réseau	Poly	HEC	BNQ	McGill	Concordia	Bishop's	Ensemble
1979-80	69.7	77.8	(1)	(2)	96.7	103.9	(3)	202.4	84.2	206.1	97.3 (4)
1980-81	67.8	81.0	(1)	(2)	89.9	96.9	(3)	198.1	72.3	205.4	94.0

4. Distributions (in graphic form) of salaries for employees within each personnel category permits a comparison of salaries within the library network.



- Automation

Automation of the process of compiling and analysing the statistics collected will allow additional refinements in the presentation of these statistics, and will make feasible the calculation of those figures, such as median and average salaries for all employees, that are difficult to calculate manually.

This automation will become possible as a result of collaboration between CREPUQ and Statistics Canada[1]. At present CREPUQ is in the process of negotiating an agreement with this national agency and the steps taken so far have been positive and show great promise.

(1) Statistics Canada, as indicated by its name, is the organization responsable for gathering, analysing, etc. statistics concerning social, political and economic activity in Canada. Statistics Canada gathers statistics on Canadian university libraries.

D- Future prospects

The preceding description of the various statistical categories in the questionnaire and the methods used to obtain statistics which are reliable and comparable from one institution to another, is only the first step in a process which could eventually result in the setting up of a collective management tool.

It became rapidly apparent to the library directors who initiated the first step that we could not stop at the mere compiling of statistics. Even though very informative by themselves, these statistics need to be completed by detailed comparative analysis to identify principal characteristics and show the relative position of each library within the Quebec university system. For example, a comparison of statistics on documentary resources, work stations, stack and floor space should be able to provide useful information on the present physical capacity of each library as well as its potential for development. Similarly, a comparative analysis of library personnel could encourage libraries to reexamine work loads and salary scales.

However, these statistics and their use, are not, by themselves, a real management tool. More specific and detailed elements are needed. Hoping to achieve such a management tool, the library directors gave the task force a parallel mandate to develop methods of integrating administrative statistics, particularly productivity indices and activity analyses of various library services. While the intention is laudable, its application still presents real problems for the members of the task force.

In order to ascertain more clearly the feasibility of this instrument, the members of the task force felt it preferable to begin by examining a single library activity. Interlibrary loans was chosen for this purpose because of the relative similarily of operations in different institutions and the ease of identifying and measuring the activities involved. In addition, because interlibrary loan services also affect the operation of those libraries with which they exchange materials, there was naturally a strong interest in this area.

The appropriateness of this choice was soon apparent when the university library directors set in motion a far reaching inquiry into interlibrary loan activities. The goal of this study was to improve the effectiveness and economy of interlibrary loan operations. This involved the development of a metholology for evaluating the operations within each institution, and collecting uniform statistics that could permit the revision of existing inter-institutional agreements and procedures. The instruments developed by the group, althougn incomplete, and the expertise developed by the members of the task force were quite useful to the head of the interlibrary loans study, particularly in the creation of other questionnaires in this area. Conversely, the results of this study and the problems encountered can aid the task force in determining the pertinence and feasibility of this type of study for library management.

These remains much to learn, however, it has been proven that the work of the task force is fruitful and useful for Quebec university libraries, due to the importance and quality of the statistics collected. With regards to the future, although it may never be possible to develop the desired instrument for the exchange of statistics required for administration, or it may be shown that such an instrument is too costly to be justified by the results obtained, we believe that the activities of the task force will nonetheless be useful for their contribution to the advancement of our knowledge of this complex subject.

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LIBRARY MANAGEMENT INFORMATION SYSTEMS:

CONCEPT, POTENTIAL, AND PLAN OF ACTION

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Library Management Information Systems:
Concept, Potential, and Plan of Action

The concept of a Library Management Information System is explored in this paper. Several relevant research efforts in measuring the effectiveness of libraries and the development of library management information systems are reported. The potential of a library management information system is explored for local, state, regional, national, and international levels. A suggested plan of action for library management information systems is presented.

INTRODUCTION

In almost any discussion of current library problems, some library manager will cite the need for more current relevant management information. The information is needed to develop current and long-range strategic plans. It is necessary for justifying current and projected expenditures and/or budget requests. Additionally, economists tell us that current economic and political trends portend an absolute decline in library funding, at least in the United States, by the mid to late 1980's (Drake, 1980). That decline in itself will require libraries to become more efficient and effective, but the need will become more critical because libraries will likely face stiff competition from private sector information brokers. More importantly, as signaled by the appearance of online data bases, the growth of the in-home computer industry and other such warning signs, the world in which libraries operate is beginning to change. A "new librarianship" must evolve quickly if libraries are to keep up with the shift. Librarians will have to know where they stand now and have clearly articulated where they plan to go next. Only with more dynamic management information and sophisticated analytical and managerial skills will they keep libraries viable in the electronic age.

One of the more promising means of providing such needed management information is the library management information system (LMIS). A management information system, as defined by the McGraw-Hill Dictionary of Scientific and Technical Terms (Lapedes, 1969) is "a communication system in which data are reported and processed to form the basis for decisions by top management of an organization." The term "library" is added as a prefix to narrow the concept to the field of librarianship. For a more complete discussion of the terms "library", "management", "information", and "system", readers are referred to the Proceedings of the Nineteenth Annual Clinic on Library Applications of Data Processing (Jacob and Kaske, 1982).

BACKGROUND

In looking over just the last ten years of library/information science literature, a need for and a movement toward LMIS is reflected. Five years ago, F. W. Lancaster's book, The Measurement and Evaluation of Library Services was published (Lancaster, 1977). This text reports on many evaluative studies and places the evaluation of libraries in a clear context, as shown by the first paragraph from the book:

> "Evaluation is one of the important steps in the administrative process. In brief, it consists of the comparison of performance with the objectives of the agency, in order to determine (a) whether there has been any change in performance for a given time period, (b) if so, whether the change is in the desired direction, and (c) if so, to what extent. The theory of evaluation is quite simple; you need to have specific and clear objectives, and you need to have measurement tools which are easy to apply and are adequate for the purpose." (p. vii)

These sentiments are echoed repeatedly in the papers from a 1980 American Library Association preconference on library effectiveness (ALA, 1980). Participants from libraries of all sizes and types delivered papers citing the need for measurement of performance, suggesting models and methodologies, and judging the effectiveness of various library operations.

Defining measurable library objectives can be a substantial problem, as noted in Library Planning and Decision-Making Systems (Hamburg et al., 1974). The researchers found that the stated objectives of libraries are often too general and thus not measurable. As an alternative, they developed and tested measures of performance. These measures emphasized the cost of providing library materials (books) with "exposure benefits" patrons could obtain by using the materials.

Computerized library network services have provided the means for many libraries to measure a number of their costs, while at the same time meeting their ultimate objective of improving service to users. As recently stated by OCLC President, Rowland C. W. Brown, the network objective is "reducing the rate-of-rise of costs in libraries. . .while at the same time making it possible for more and more libraries to share resources more efficiently than ever before and to improve patron services" (OCLC, 1981).

For librarians in public libraries, DeProspo's work (DeProspo et al., 1973) has helped to explain what should be measured and why. Methods for collecting the needed statistics are presented in A Data Gathering and Instructional Manual for Performance Measures in Public Libraries (Altman et al., 1976). The problem of defining terms has been addressed by working groups within the American Library Association. The results of their labor can be seen in two very useful recent publications, the Library Data Collection Handbook (Lynch and Eckard, 1982) and Output Measures for Public Libraries: A Manual of Standardized Procedures (American Library Association, 1982).

Literature specifically related to the topic of library management information systems is not large. Kaske offered and tested one of the first LMIS for academic libraries (Kaske, 1973). Miller was one of the first to offer a system to special libraries (Miller, 1972).

Two works reported in a recent issue of the Public Library Quarterly offer additional relevant information to the managers of public libraries. "Methods of Evaluation of Public Library Systems" (Campbell, 1980) reports the results of an interlibrary comparison in the United Kingdom. The test made use of various costs and input/output statistics, and proposed a standard reporting format. The second article, "Measurement of Service at a Public Library" (Wood et al., 1980) reports on a study that measured, via sample statistics, the volume of use, user activity, and the availability of items sought by library users.

Managers of special libraries will find both a rationale for evaluative measurement and solid advice on how and what to measure in a recent article in Special Libraries (Strain, 1982). The author offers the report on the methods she used to collect and evaluate data in the hope that other library managers will also begin to collect and report similar performance data for comparative purposes. Though she notes that the statistics can only be "guideposts" for the library manager and do not precisely define the one appropriate course of action, they may warn of a potential problem.

Figure 1

Library Management Information Systems Monthly Report

	This month this year	This month last year	Y-T-D this year	Y-T-D last year	% Change monthly	% Change Y-T-D
SERVICES						
Users						
Turnstyle count						
Patrons registered (Faculty, students, staff, etc.)						
Total target population (Faculty, students, staff, etc.)						
% of target population registered						
Active users (% of population with charges by user group)						
Circulation						
Charges (Faculty, students, community users, etc.)						
Reserves						
Discharges						
Holds						
Recalls						
Overdues (1st notice, 2d notice, etc.)						
Fines collected ($)						
Interlibrary loan (Loans, requests, etc.)						
Items in circulation						
Average charges per user to: (Faculty, students, staff, etc.)						
Average loan duration						
Average charge per patron fined						
Information and Instructional Services						
Questions answered (Directional, reference, research, etc.)						
Tours and attendance						
Classes offered and attendance						
Bibliographies prepared						
SDI notifications						
Outside contacts						
Database searches						
Special Collections						
User count						
Reference and research questions						
Materials paged						
FACILITIES						
Space Utilization						
Shelving (linear feet)						
-Expansion space available						
-Additions:						
Reference collection						
General collection						
Serials Collection						
_ % utilization						
Seating						
_ Total available						
_ Sample use counts						
_ % utilization						
Faculty studies						
_ Reservations						
_ Sample use counts						
_ % utilization						
COLLECTIONS						
Collections Growth						
Print Materials Added						
Books - Volumes						
Serials issues						
U.S. Documents						
State and local documents						
United Nations documents						
Nonprint Materials Added						
Microfilm rolls						
Microfiche						
Microcards						
Cassettes						
Audio						
Video						
Phono discs						
Kits						
Materials Withdrawn						
Total Items Added to Collections						

BEST COPY AVAILABLE

Signs of profession-wide interest in the development of an LMIS have recently appeared in a College and Research Libraries article (Runyon, 1981) and a 1982 American Library Association Annual Conference meeting on the subject. In a paper prepared for the ALA meeting, Mary Jo Lynch, Director of the A.L.A. Office for Research, proposes a method for implementing a comprehensive statistical data-gathering effort (Lynch, 1982). The process would involve seeking agreement from all current reporting agencies on the categories of data to be gathered, definitions, and procedures--a time-consuming and complex task, but one essential to the ultimate goal of a national (and perhaps international) comprehensive statistical system.

In the Runyon article, entitled "Towards the Development of a Library Management Information System," there is a clear statement of the basic informational elements needed in a library management information system. A listing of these elements, which he credits in part to others (Dowlin, 1980; Woodley, 1976), is displayed in Figure 1 (below). He suggests that the system be developed and offered by a computerized library network organization such as OCLC, although other networks such as UTLAS (University of Toronto Library Automation Systems), BLAISE (British Library Automated Information Service), etc., could as easily offer such a system. In addition, this author suggests that the data be collected and aggregated by size/type of library and also by state, region, nation and, perhaps, a consortium of nations.

POTENTIAL

A library management information system's goal is to provide library managers with timely reports on which to base informed decisions. The information should come from the processing of statistics collected (on sample and population bases) about numerous library input and output activities. These activities should be expressed in the form of inputs such as library materials, funds and staff and as outputs such as number of items circulated, reference inquiries answered and the like. Relationships (ratios) between inputs and outputs should also be provided. These, and various other "service ratios" should clearly signal to the library manager the appearance of any number of potential problems. For example, in very simplistic terms, an apparently substantial increase in circulation might seen less significant when placed in perspective against a much larger increase in the number of potential library users. Figure 2 (below), borrowed from Output Measures for Public Libraries (ALA, 1982), provides a useful list of such measurements. The results should also be projected forward under various contingencies, so that library management can foresee and plan for potential problems. For example, a library joining a computerized library network will generally, over time, process and eliminate any long-standing backlog of material until at a certain critical point, the rate of throughput will stabilize because the backlog has essentially been eliminated. At this critical juncture, the need for staff in the catalog area diminishes and can be reduced by transfer to other units, retraining, attrition, etc. With an adequate LMIS, the critical point could be projected in advance, and plans for staff reduction could be ready when needed.

Figure 1 Cont'

	Budgeted	Expended to date	Expended this month	Current balance	% utilized
BUDGET					
Personal Services ($)					
Facuity					
Library assistants					
Part-time employees					
Total savings					
Departmental Allocations for Hourly Employees ($)					
Administration					
Circulation					
Collections development					
Reference					
Technical services					
Acquisitions Expenditures ($)					
Books					
Direct order (Faculty, library, etc.)					
Approval plan					
Standing order					
Serials					
Departmental allocations (Anthropology, biology, ...etc.)					
Cost per item purchased					
Dept. personal expenditures/items purchased					

Library _____

OUTPUT MEASURES OVER TIME

	Measure	19___	19___	19___	19___	19___
1	CIRCULATIONS PER CAPITA					
2	IN-LIBRARY MATERIALS USE PER CAPITA					
3	LIBRARY VISITS PER CAPITA					
4	PROGRAM ATTANDANCE PER CAPITA					
5	REFERENCE TRANSACTIONS PER CAPITA					
6	REFERENCE FILL RATE					
7	TITLE FILL RATE					
8	SUBJECT AND AUTHOR FILL RATE					
9	BROWSERS' FILL RATE					
10	REGISTRATION AS A PERCENTAGE OF POPULATION					
11	TURNOVER RATE					
12	DOCUMENT DELIVERY					
	a WITHIN 7 DAYS					
	b WITHIN 30 DAYS					

Figure 2

The potential for library managers to develop a management information system which accurately reports the efficiency/effectiveness (or lack thereof) of their library's service is excellent. A basic list of the data elements (statistics) to be collected is suggested in Figures 1 and 2. Methods for collecting these statistics and for analyzing them have been offered and, in some cases, tested. (Libraries at the University of California at Los Angeles, the MITRE Corporation, and Pikes Peak Regional Library System, to name a few, already have management information systems in the operating or planning stages.) If the statistics suggested by Runyon and others were collected and analyzed over several years, a number of important, statistical inferences about these individual libraries could be made. Once consensus on the definitions of the data categories is reached through the offices of an organization such as the A.L.A. Office for Research, a valuable database of comparative statistics also can be built. Significantly, statements on library conditions would then be derived from factual data and not from "best guesses." As an example, the relationships between the size of collections and the use made of collections could be measured. Also, answers to questions such as "is bigger better and if so, under what conditions," could be sought. The levels of services (reference questions, database searching, classes offered, etc.) could be contrasted to see how they differ among the types and sizes of libraries in different geographical areas. Also, the percentages of budgets expended for staff at different levels (managers, catalogers, clerks) could be compared, as could the cost of different library services (reference, childrens, films, etc.). These comparisons could again be made on local, state, regional, national, and if desirable, international bases. Of perhaps greater importance, individual library management teams would have hard statistical data on the condition of their library over a given time period. Library management information systems offer a way to collect, analyze, and display the needed statistics. A plan for developing such a system is offered below.

A PLAN OF ACTION

The goal of this action plan is to improve library services by providing a Library Management Information System to library managers. This goal will be reached in part by meeting the following four measurable objectives: 1) develop a general LMIS as called for by Runyon; 2) field-test the system for two years; 3) evaluate and report upon the usefulness of the library management information system to library managers; and 4) establish an ongoing LMIS.

The development of the LMIS should take full advantage of the work that has been done to date. This means that before a generalized LMIS is offered, past research should be reviewed for a listing of input statistics to be collected. Additionally, a call to library managers for information on any current LMIS's should be made. The methods of data collection already tested should be evaluated and offered where possible. The work previously done in defining the many terms should be fully utilized. The programs should be developed in a modular fashion so that library managers can select those statistics they wish to collect and input to the LMIS. The list of input statistics should be large so that libraries of most types and sizes can use the system. The computer programs should be written to run on a microcomputer with selected data also being relayed to a central library network computer, as shown in Figure 3.

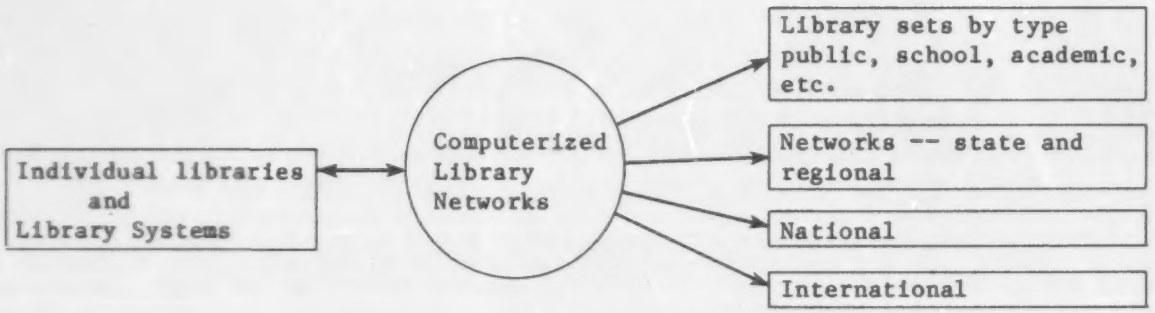

Figure 3

The second major objective is to field-test the LMIS in a number of libraries. Library managers willing to give their time and energy to this effort will be encouraged to take part. However, at least ten from each of the following types of libraries should be included: public, school, special, academic/research, and state. These managers should select from the list of input statistics to be collected, collect the data, input it, and obtain the LMIS report at least monthly for two years.

The evaluation process will be ongoing over the life of the project. This will be made possible by first getting written reactions from library managers to the proposed LMIS. Then monthly, via "use logs," a written report on the use made of the data of the LMIS will be obtained. The "use logs" will be supplemented by both individual and group interviews with the library managers utilizing the system. Reports based on this information will be published twice a year via the library journal literature.

Recommendations for changes in the LMIS will be accepted over the life of the project. Where possible these recommendations for changes will be incorporated into the system.

At the end of the two year experiment, the final test will be made. That is, the LMIS will be offered to the general community of library managers on a fee basis, and the marketplace will judge its acceptability.

SUMMARY

There is strong economic evidence supporting the establishment of library management information systems. They would provide managers with the means to measure their library's effectiveness and efficiency and to compare these with those of similar libraries. The end purpose of such analyses would be to improve the input/output ratios in libraries, thus allowing them to remain viable in a rapidly changing environment. The optimum method of implementing the LMIS seems, at this early stage, to be the combination of the strengths of the microcomputer and computerized library network services to achieve a system such as that proposed by Runyon in which the local library could collect and analyze its internal statistics for current and strategic planning, while at the same time adding agreed-upon statistics to a state, regional, national and/or international database. To accomplish such a goal, however, will require time, effort, and a concerted cooperative effort, as great differences currently exist in statistical reporting. The realization within the profession that such a reporting system is needed is the first step. But, only with a call for such a system by concerned individuals and groups will planning be initiated.

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